# Traditional and New Methods of Assessing Coping in Sport

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*Chapter 3*

# TRADITIONAL AND NEW METHODS OF ASSESSING COPING IN SPORT

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## ABSTRACT

Over recent years, a variety of different methods have been employed in sport to measure coping among athletes. A large volume of research has used traditional methods such as questionnaires and interviews. However, more recently researchers have adapted different techniques from the mainstream psychology literature such as concept maps, diaries, think aloud protocols. One method that has not been used in sport, but has potential is Ecological Momentary Assessment. The purpose of this chapter is to describe the various methods used to assess coping, illustrate how each method can be used, and discuss its strengths and limitations.

## INTRODUCTION

Researchers within the sport psychology literature have adopted a variety of methods, both qualitative and quantitative, to explore how athletes cope with stress in relation to athletic competition. Different methods allow researchers to address different research questions. It is therefore imperative that the correct methods of measuring coping are selected in relation to the question that coping scholars wish to address. Early studies on coping within the sport domain were quantitative in methodology and relied on questionnaires, followed by an emergence of interview studies. More recently different techniques, such as diaries, concept maps, and think aloud protocols, have been developed and/or adapted from other contexts to assess coping in sport. Another method, ecological momentary assessment, which has not been used within the sport literature to assess coping, will be reviewed in this chapter due to its potential relevance for sport research.

## Questionnaires

The most frequently used questionnaires to assess coping in sport are the Inventaire des Stratégies de Coping en Compétition Sportive (ISCCS; Coping Strategies in Sport Competition Inventory), the Modified COPE inventory (MCOPE), and the Coping Function Questionnaire (CFQ). All three questionnaires were developed using a theoretically-based approach and rely, to a different extent, on Lazarus and Folkman's (1984) conceptual framework and Carver and Scheier (1989) COPE measure. Some initial evidence for the psychometric properties of the three instruments has been provided in the literature, however, all three could benefit from further psychometric testing and improvements.

## Coping Strategies in Sport Competition Inventory (ISCCS)

The ISCCS was developed by Gaudreau and Blondin (2002) and has been primarily tested with French-speaking athletes. Gaudreau and Blondin quite rightly argued for the need of sport-specific measures of coping, as measures developed in other contexts might have low relevance or predictive validity in sport settings. The development of the ISCCS item pool was very extensive, involving a review of relevant literatures from sport and other areas of psychology, and pilot testing of item content with athletes, coaches, and sport psychology researchers. In contrast to the other two questionnaires reviewed here, the ISCCS includes a number of basic psychological skills (e.g., imagery and self-talk) which Gaudreau and Blondin argued are relevant in terms of understanding how athletes cope with stress. Using a sample of 306 Canadian athletes (*M* age = 17.4; *SD*= 2.15) from a variety of sports and competitive levels, Gaudreau and Blondin used a sequential confirmatory factor analysis (CFA) approach to reduce an initial pool of 95 items to 39 items measured on a 5-point scale (1= *not used at all*; 5= *used very much*). Ten factors were hypothesized: thought control, mental imagery, relaxation, effort expenditure, logical analysis, seeking support, venting of unpleasant emotions, mental distraction, disengagement/resignation, and social withdrawal. Gaudreau and Blondin showed that the 10 first-order factor model had better fit indices than those of alternative models (i.e., two- and three-factor ones describing more general dimensions of coping). Although the incremental fit indices (i.e., CFI and TLI) were slightly below recommended cut-off levels (Hu and Bentler, 1999), given the complexity of the factor model and the number of items analysed, these fit indices should be considered as satisfactory. Gaudreau and Blondin suggested that the first six factors are aspects of task-oriented coping and the latter six factors are indicators of emotion-oriented coping, however, they did not test such a hierarchical factor model.

Gaudreau and Blondin (2002) also reported satisfactory internal reliability coefficients for most ISCCS subscales. Further, the authors provided some evidence of concurrent validity by correlating the ICSS subscales with subscales from the MCOPE and the Ways of Coping Questionnaire (Folkman and Lazarus, 1985), although some of the correlations were not in the expected direction. Evidence of predictive validity was also offered by correlating the ISCCS subscales with cognitive appraisal and affective variables. Further evidence for the predictive validity of the ISCCS has been provided by Gaudreau and Blondin (2004), and Nicholls, Polman, Levy and Backhouse (2008), showing associations between coping strategies and measures of optimism, pessimism, goal attainment and affect.

As with all instrument development efforts, sample-specific modifications to obtain a good model fit need to be cross-validated with independent samples. Unfortunately, there has been only one other study that has examined the factorial structure of the ISCCS with an independent sample. Gaudreau, Ali and Marivain (2005) used 366 French marathon runners, from a very diverse age and competitive level background, to cross-validate the ISCCS. Preliminary data screening and reliability analysis resulted in the removal of 10 items and one factor (imagery), thus the cross-validation of the ISCCS version reported by Gaudreau and Blondin (2002) was not possible. Employing again a sequence of CFA's, Gaudreau et al. provided support for a 28-item nine-factor model. However, acceptable model fit was obtained only when 4 pairs of residuals were allowed to correlate. Although the authors defended these post-hoc correlations, correlated errors are problematic as they indicate high item overlap and possible item redundancy (as also acknowledged by Gaudreau and Blondin, 2002). Furthermore, Gaudreau et al. examined the hierarchical structure of the ISCCS and advocated support for a three second-order factor model (i.e., task-, distraction- and disengagement-oriented coping). However, the hierarchical model was problematic as it included a first-order factor (i.e., mental distraction) which cross-loaded on two second-order factors (i.e., distraction and task coping), and also had correlated error terms. Further, the fit of the hierarchical model was marginal and very similar to the fit of alternative first-order factor models.

Very little additional evidence has been reported in the literature regarding the psychometric properties of the ISCCS. Amiot, Gaudreau, and Blanchard (2004) presented the results of an exploratory factor analysis of the original 10-factor model with a predominantly French-speaking sample. Their analysis was carried out on the 10 subscale scores and not on the individual items. In contrast to the three higher-order factor model proposed by Gaudreau et al. (2005), Amiot et al. reported a two-factor model solution with task-and disengagement-oriented coping factors. In conclusion, there is no consensus in the literature as to the optimal number of items, first-order and second-order factors of the ISCCS.

## Modified COPE Inventory

Unlike the ISCSS, the MCOPE has been predominantly used with English-speaking samples. The scale was first presented by Crocker and Graham (1995) and relies heavily on Carver and Scheier's (1989) COPE inventory. In fact, 9 of the 12 subscales of the MCOPE are taken from the COPE with modifications in the wording of some items to make them more applicable to sport: active coping, seeking social support for instrumental reasons, planning, seeking social support for emotional reasons, denial, humour, behavioural disengagement, venting of emotions and suppression of competing activities. Some of these strategies are also assessed by the ISCSS. The three other subscales of the MCOPE are based on previous sport-specific coping research and are self-blame, wishful thinking and increasing effort. Each item is scored on a 5-point scale (1= *used not at all/very little,* 5= *used very much*). Crocker and Graham tested the MCOPE with a sample of 377 athletes from a diverse background in terms of age, sport, and competitive experience. The athletes were asked to recall a recent situation in which they experienced performance difficulties or felt under pressure to perform. Cronbach internal reliability coefficients were satisfactory for all subscales except the one tapping denial (alpha =.42). The authors reported conceptually

meaningful relationships between some of the coping strategies and positive and negative affect. Rather surprisingly, Crocker and Graham did not examine the factorial structure of the MCOPE.

This limitation was subsequently addressed by Eklund, Grove, and Heard (1998) who examined the factorial structure of both the COPE and MCOPE with a large diverse sample of 621 Australian athletes. A strength of this study was the employment of a cross-validation procedure which involved randomly splitting the large sample into two equal sub-samples and cross-validating the findings from the first sub-sample with the second sub-sample. The stressor under examination was performance slumps (i.e., unexplained significant reductions in performance levels). Eklund et al. utilised CFA procedures to compare the fit of a 12-factor MCOPE model against alternative models which had 11 and 10 factors respectively, derived by combining some of the subscales of the MCOPE. The model fit of all examined models was very similar but the authors argued for the 10-factor model which was more parsimonious and did not have very high factor correlations. In this 10-factor model the strategies of planning and active coping were combined, as well as the two social support subscales. However, an inspection of the incremental fit indices (unfortunately, other important fit indices such as the RMSEA and the SRMR were not reported) suggests that the 10-factor model fits very modestly and has considerable room for improvement. This was also noted by Eklund et al. Surprisingly, the fit indices of the COPE which was not modified for sport settings and which included more factors (14) were better than those of the MCOPE. Unfortunately, the hierarchical structure of the MCOPE was not tested by Eklund et al. The Cronbach alpha coefficients for all subscales were acceptable.

Although the MCOPE has room for improvement, there have been no other studies testing and improving its psychometric properties. Such studies are clearly needed. However, various other studies in the literature have offered support for the predictive validity of the MCOPE by showing conceptually meaningful relationships between coping and achievement motivation indices (Ntoumanis, Biddle and Haddock, 1999), competitive trait anxiety (Giacobbi and Weinberg, 2000), performance goal discrepancy and positive/negative affect (Gaudreau, Blondin, and Lapierre, 2002).

## Coping Function Questionnaire (CFQ)

Unlike the ISCCS and the MCOPE, the CFQ taps general coping functions as opposed to specific coping strategies. The questionnaire was first presented by Kowalski and Crocker (2001) who tested its validity and reliability in two samples of adolescent athletes. The CFQ assesses three coping functions: problem-focused, emotion-focused and avoidance. Kowalski and Crocker argued that assessing general coping functions can aid researchers to examine how coping changes over time and across situations. In contrast, coping behaviours, as for example those targeted by the ISCCS and the MCOPE, can be too specific to the sample or situation under examination and this can hinder any efforts for generalising findings. However, an inspection of the CFQ items indicates that they actually tap specific coping behaviours (e.g., increasing effort, planning, behavioural disengagement) which might be more relevant to some sport situations than others.

Crocker and Graham initially developed a pool of 30 items based on the coping literature in sport and other life domains. The number of items was reduced to 19 via pilot testing

involving athletes and researchers in sport psychology. The first sample used by Crocker and Graham consisted of 126 high school students of seemingly low competitive level. The students were asked to rate the coping items by referring to the most stressful situation they experienced in the previous year in their sport or in another physical activity setting. Interestingly, for each coping item there were separate measures of frequency, duration and effort, however, the scores from these scales were highly correlated. Further, all ratings related to avoidance coping exhibited poor internal reliability. The scale was subsequently modified by Crocker and Graham by rewording, adding and deleting items, and by keeping ratings related to frequency of coping only. It is unfortunate that the ratings for duration and effort were dropped based on the results obtained from a small sample of a seemingly low competitive standard, but one can appreciate that short scales are likely to have higher participant completion rates and perhaps more accurate responses.

The modified CFQ was tested by Kowalski and Crocker (2001) with an independent sample of 835 students of non-specified competitive status. The questionnaire contained 18 items scored on a 5-point scale (1= *not at all*; 5= *very much*). CFA of a three-factor model, performed first separately and then simultaneously across gender, provided very modest fit indices, indicating considerable room for improvement. The authors identified an item that could improve model fit but they were reluctant to delete it. It is surprising that no subsequent studies have further tested the factorial structure of the CFQ. The internal reliability coefficients for all three coping functions were above .80. Lastly, Kowalski and Crocker (2001) offered evidence of the concurrent validity of the CFQ by correlating its subscales with scales from the COPE, the MCOPE and the Life Situations Inventory (Feifel and Strack, 1989). Evidence for the predictive validity of the CFQ in adolescent samples has been provided by Kowalski, Crocker, Hoard and Niefer (2005), and Bolgar, Janelle, and Giacobbi (2008), by relating its subscales with measures of control beliefs, perceived stress and trait anger. Lastly, Hanton, Neil, Mellalieu and Fletcher (2008) used the CFQ with adult athletes (18-36 years) and found that current-elite athletes used more problem-focused and emotion-focused coping, and perceived such coping responses as more effective, than past-elite athletes.

## Interviews

There are three types of interviews: structured, semi-structured, and unstructured. Within structured interviews all participants are asked the same questions in exactly the same order. When a semi-structured interview is used participants are asked the same questions, but the order can fluctuate depending on the interviewer who also may wish to explore different avenues that may arise during the interview (Patton, 2002).If the aim of a piece of research is to compare the findings of participants, either a structured or unstructured interview is preferable as the participants will be asked the same questions Finally, interviews that adopt an unstructured approach are guided by the participant and his/her responses (Patton, 2002). Unstructured interviews are more suitable to research questions in which the researcher places less emphasis on comparing the responses of participants. This is because the interviews are participant-driven. In theory, 10 interviews could be conducted that could have completely different content. Virtually all interview studies that have assessed coping in sport utilized a semi-structured interview.

In order to illustrate the processes of conducting an interview study in coping, a recent example from the sport psychology literature will be described in detail. Holt and Hogg (2002) explored stressors and coping strategies among a sample of 10 female soccer players who were about to participate in the 1999 World Cup. Before the interviews were conducted, two pilot interviews were carried out to ensure that the interview guide was suitable. Semi-structured interviews, which lasted between 45 and 60 minutes, were conducted by the lead author during a residential training camp. Participants were initially asked some general background questions relating to their career and the training camp. Questions were centered on a performance framework, which was used to determine the stressors the players had experienced. When the players had described the stressors they had experienced they were asked "How did you/are you dealing with that" (p. 257) to explore the coping strategies used.

Holt and Hogg (2002) analyzed their data in accordance with the framework provided by Maykut and Morehouse (1994). All interviews were transcribed verbatim and individual meaning units relating to stressors and coping strategies were identified. Similar meaning units (e.g., stressors and coping strategies) were grouped and given a phrase that summarized the essence of each meaning unit within that category. To ensure the accuracy of these groupings, each meaning unit was scrutinized using the constant comparative method (Glaser and Strauss, 1967). Following this procedure, the authors discussed the themes that had been derived from analyzing the data. An external auditor with previous experience in sport psychology and qualitative research examined categories and early versions of the manuscript. In order to ensure the goodness of the data triangulation (Patton, 2002) was conducted where: (a) interview data was corroborated via observations from the lead author who was a sport psychologist in the camp, (b) member-checks to ensure what happened had been accurately reported in the research (Lincoln and Guba, 1985), and (c) checking whether information was factually correct with the governing body for soccer.

Four main stressor categories were reported, which included coaches, demands of international soccer, competitive stressors, and distractions. To manage these stressors, the players reported using a variety of different coping strategies that were categorized as reappraising (e.g., positive self-talk), use of social resources (e.g., family support), performance behaviors (e.g., on field task communication), and blocking (e.g., blocking irrelevant stimuli).

A potential issue with interviews (and questionnaires for that matter) is whether athletes are able to accurately remember how they coped when recalling coping strategies. For instance, Gould, Eklund, and Jackson (1993) interviewed wrestlers about how they coped during an Olympic Games six months after the competition had finished. Many interview studies in the sport psychology literature do not report the period between the stressful event and the recall of the coping strategies. Stone et al. (1999) compared momentary assessments coping reports over 48 hours with retrospective reports of coping that took place immediately after the momentary assessments had finished, among a non-athletic sample. Participants retrospectively underreported cognitive coping, whereas they over reported behavioral strategies. Around 30% of participants failed to retrospectively report items they had reported on the momentary assessments. Furthermore, 30% of participants reported items that were not reported on the momentary assessments, despite the same questionnaires being used. It appears that participants may forget, underreport, or over-report when retrospectively recalling coping strategies (Folkman and Moskowitz, 2004). This finding is supported by other researchers from the mainstream psychology literature (e.g., Ptacek, Smith, Espe, and

Raffety, 1994; Smith, Leffingwell, and Ptacek, 1999), who found that with passage of time people provide less accurate coping accounts. Indeed, Ptacek et al. (1994) found evidence to suggest the validity of coping strategies recalled over a recall period between 5-day to 12-day period is questionable. Therefore, interviews to assess coping should be conducted as close to the stressful event as possible and within a 5-day period to ensure that the data is valid.

## Concept Maps

Concept maps proposed by Novak and Gowin (1984) are node-link diagrams that represent concepts or relationships between different variables. In a sporting context, concept maps have been used to explore stressors and coping among athletes (e.g., Holt and Mandigo, 2004; Nicholls, Polman, Levy, Taylor, and Cobley, 2007). In these two studies each concept map consisted of six numbered blank boxes in which participants were able to report their data. Participants were asked to recall stressors (see Figure 1) and the corresponding coping strategies they used to manage each stressor, by reporting the coping strategy used in the corresponding numbered box (see Figure 2).

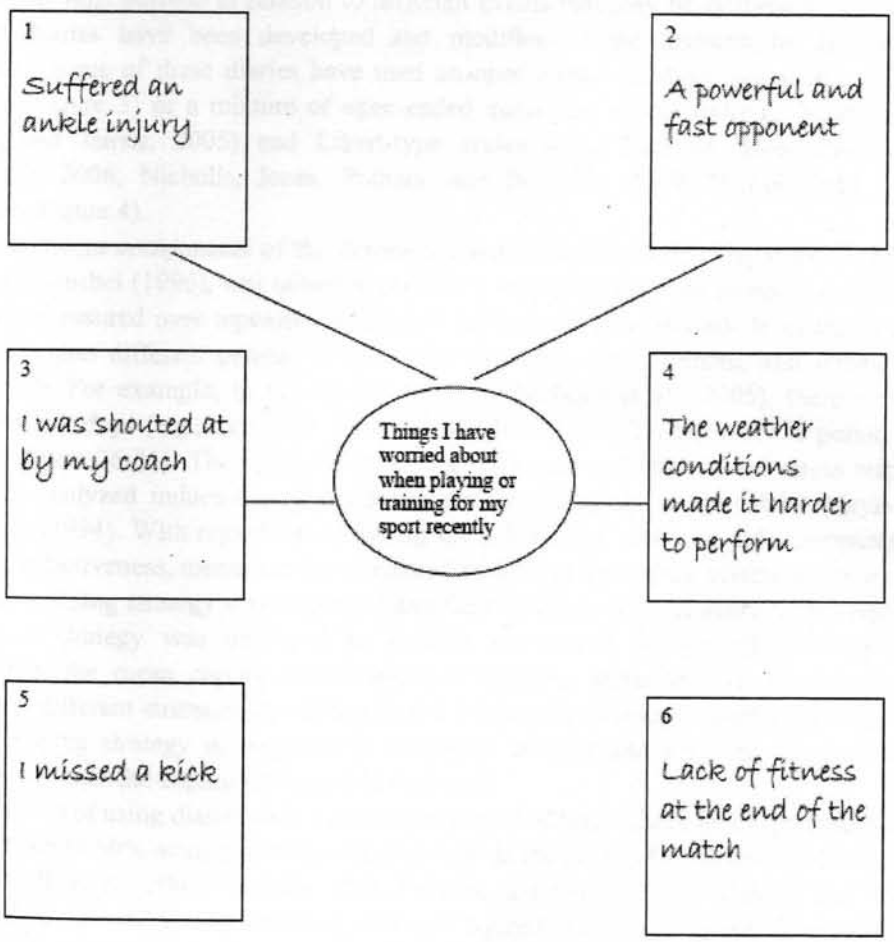


Figure 1. Stressors in Sport Concept Map.

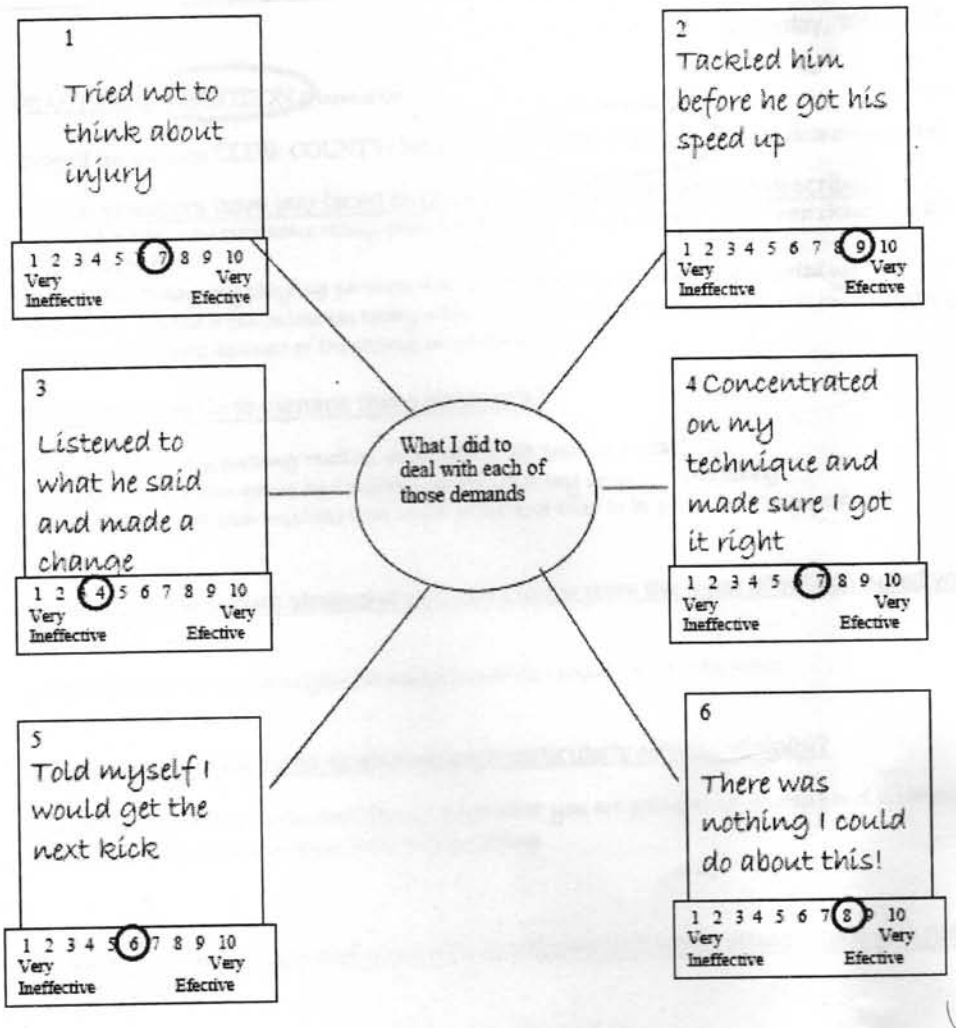


Figure 2. Coping in Sport Concept Map.

For instance, in the example provided the athlete reported injury as a stressor in Box 1 of the stressor concept map (see Figure 1) and coped with this stressor by blocking out thoughts of the injury (see Box 1, Figure 2).

Similar to questionnaires, concept maps are relatively quick to complete. Athletes should be able to complete a pair of stressor and coping concept maps within 15 to 20 minutes, which means it is possible to generate large amounts of data. Unlike questionnaires, the responses of participants are not pre-determined, so athletes' responses are not constrained.

With regard to analyzing data generated from concept maps, a variety of qualitative and quantitative procedures can be carried out. The initial phase is to transcribe the data from the concept maps. Nicholls et al. (2007) identified individual meaning units from the stressor and coping concept maps and grouped similar meaning units together. A descriptive label that reflected the meaning of each theme was given to each unit, in accordance with Maykut and Morehouse (1994). Following this procedure, a range of statistical tests can be used.

Although the studies by Holt and Mandigo (2004) and Nicholls et al. (2007) have only explored the relationship between stressors and coping, other variables could be introduced.

Other components of stressors and coping could also be explored, such as stressor intensity, stressor controllability, coping effectiveness, and coping automaticity. For instance, other concept maps could include constructs appraisals and emotions. A potential limitation of using concept maps relates to the open-ended format of the questions. Unlike interviews, participants do not have somebody to provide them with prompts, which may limit the responses provided. Furthermore, this type of data will be vulnerable to memory decay associated with the retrospective recall of coping (e.g., Stone et al., 1999). It is therefore essential that researchers minimize the delay between the stressful event and the recall of the stressors and the coping strategies in the concept maps to within 5-day period.

## Diaries

A recent systematic review revealed that over 80% of sport psychology coping studies adopted the transactional approach (Nicholls and Polman, 2007a). In an attempt to reduce the recall period and to tap into the dynamic nature of coping, scholars have utilized diaries to assess coping on a daily basis (Porter and Stone, 1996). This allows coping to be compared over various time periods in relation to different events that may be occurring. A variety of different diaries have been developed and modified in the research by Nicholls and colleagues. Some of these diaries have used an open-ended question format (e.g., Nicholls 2007; see Figure 3) or a mixture of open-ended questions, checklists (e.g., Nicholls, Holt, Polman, and James, 2005) and Likert-type scales (e.g., Nicholls, Holt, Polman, and Bloomfield, 2006; Nicholls, Jones, Polman, and Borkoles, 2009; Nicholls and Polman, 2007b; see Figure 4).

The different components of the diaries are analyzed differently. The stressor checklist, based upon Anshel (1996), was tallied to provide a frequency for each stressor. As stress and coping are measured over repeated time points in diary designs, stressor frequencies can be measured within different periods of the study (Nicholls, Holt, Polman, and James, 2005; Udry, 1997). For example, in the 31-day study by Nicholls et al. (2005), there were five periods of five days (e.g., days 1–5, 6–10, 11–15, 16–20, and 21–25) and one period of six days (e.g., days 26-31). The open-ended coping responses and open-ended stress responses have been analyzed inductively in accordance with guidelines suggested by Maykut and Morehouse (1994). With regards to analyzing the Likert-type scales used for measures such as coping effectiveness, means can be calculated by adding the coping effectiveness score for each time a coping strategy was employed and then dividing the total score by the frequency of times a strategy was deployed to provide an overall coping effectiveness score. Furthermore, the mean coping effectiveness of different strategies can be calculated in response to different stressors, by adding up the coping effectiveness Likert-type scale scores for each coping strategy in response to a specific stressor and dividing the total by the frequency of times the coping strategy was deployed.

A concern of using diaries over a prolonged period of time relates to a high drop-out rate, which was up to 60% among participants, observed in the studies by Nicholls and colleagues (e.g., Nicholls et al., 2006; Nicholls, Holt, Polman, and James, 2005; Nicholls and Polman, 2007b). It is inevitable that athletes will get injured, especially those from physically demanding sports, but researchers must try hard to enhance adherence to diary studies.

Saturday, 10th APRIL

PRACTICE/ COMPETITION [Please circle].

Type of competition CLUB/ COUNTY/ NATIONAL/ INTERNATIONAL [Please circle if appropriate]

**1.What stressors have you faced today during golf (please list and describe)?**

Missing putts- I missed some really short putts today. There was one where I had chance for birdie and I missed it.
Opponents- Today my playing partners were playing really well and that worried me a bit
Mistakes- I made a few mistakes today which cost me a top 10 finish. I found it hard to get my club selection right because of the strong wind conditions

**2.What did you do to manage these stressors?**

I went through my putting routine, and tried to hit positive putts.
I focused on my own game and tried to ignore what my opponent was doing
I tried to block out each mistake that I had made and tried to be positive for my next shot

**3. Which of the coping strategies you used today were the most effective/helped you the most?**

When I focused on my own game it really helped as I could concentrate more

**4.Why do you think these strategies were particularly effective/helpful?**

Just because you can think more clearly about what you are going to do yourself and it takes the pressure off not thinking about how they are doing

**5.Were there any things that you did or attempted to manage stress which was not very effective/helpful?**

Trying to block out my mistakes was not very helpful at all.

**6. Why did these strategies not help?**

They did not really work as all I could think about was the wrong club selection to the 5th green which cost me the chance of a birdie and was the reason why I made a double bogey. I was thinking about this shot for the rest of my round

Figure 3. Open-ended Stressor and Coping Sheet.

Techniques to reduce drop could involve only giving participants diaries for seven days at a time (e.g., Polman, Nicholls, Cohen, and Borkoles, 2007), meeting participants on a regular basis, or if this is not possible sending SMS messages (e.g., Nicholls, Levy, Grice, and Polman, in press). Although diary methods reduce the period of recall which increases the validity of the data (e.g., Stone et al., 1999), Folkman and Moskowitz (2004) suggested that daily measures of coping do not allow people time for reflection, with regard to their coping.

| Section A: Please tick below if the descriptions were a worry today. You can add other worries in boxes J and K | Section B: What did you do to manage/cope with each concern that you had. Write down all the things you did to deal with each stressor | Section C: Rate the effectiveness of your strategies by circling the number<br>1 2 3 4 5<br>Not Effective ... Very Effective |
|---|---|---|
| A – Making a physical error (e.g., poor pass/missed tackle) ✓ | Concentrated on my technique for the next tackle | 1 2 3 4 5 |
| B – Making a mental error (e.g., wrong tactical decision) | | 1 2 3 4 5 |
| C – Being criticized by your coach/parents ✓ | Listened to what my coach said and tried to incorporate it into my game | 1 2 3 **4** 5 |
| D – Observing an opponent cheat | | 1 2 3 4 5 |
| E – Receiving a wrong call from official | | 1 2 3 4 5 |
| F—Observing an opponent play well ✓ | Concentrated on my own game, blocked him out and told myself I have the skills | 1 2 **3** 4 5 |
| G – playing badly due to the weather | | 1 2 3 4 5 |
| H – Being distracted by the crowd/someone warming | | 1 2 3 4 5 |
| I – Sustaining pain or injury ✓ | Wore extra support and blocked out the pain | 1 2 **3** 4 5 |
| J— Not wanting to let team mates down ✓ | Tried to be positive and trusted my ability | 1 **2** 3 4 5 |
| k— Team tactics ✓ | Told the coach my opinions | **1** 2 3 4 5 |

Figure 4. Stressor Checklist, Coping, and Coping Effectiveness Diary Sheet.

## Think Aloud Protocols

An alternative method to diaries that enables coping to be measured longitudinally and to reduce the period of recall even further is a think aloud protocol (Ericsson and Simon, 1980). In order to assess such fluctuations, repeated measurements on the same person are taken. According to Ericsson and Simon (1993) there has been an increase in the use of verbal data to assess cognitive processes in many areas of psychology. Given that coping is a cognitive

process (e.g., Lazarus, 1999), think aloud would appear to be a suitable method of assessing coping. Ericsson and Simon proposed three different levels of verbalizations, which: (a) determine the type of data collected, and (b) influence the effect that verbalizing may have on athletic performance.

Verbalizations of thoughts are classified as Level 1 and Level 2 verbalizations, whereas verbalizations of specific information, such as reasons or explanations, are known as Level 3 verbalizations (Ericsson and Simon, 1993). The difference between Level 1 and Level 2 lies in the cognitive processes involved in verbalization. Verbalizations of thoughts that are already verbal and do not need transforming, but simply to be vocalized (e.g., a thought that relates to the performance of an opponent, such as "Christopher is playing well today") is a case of Level 1 verbalizations. Conversely, thoughts that require transformation so it can verbalized are referred to as Level 2 verbalizations. This would include, for example, verbalizing images (e.g., "the coach looks annoyed today").

Ericsson and Simon (1993) reviewed the effects of verbalizations on performance. Although none of the reviewed studies were sport-based, their findings revealed that Level 1 and Level 2 verbalizations had no undermining effect on performance. In contrast, Level 3 verbalizations had a negative impact on performance. Caution is therefore warranted before asking athletes to provide Level 3 verbalizations, until research has examined the impact these verbalizations in non-competitive environments. If a study wants to explore either Level 1 or Level 2 verbalizations, participants should be instructed to say what they are thinking during a specific task or event and not to explain their thoughts.

A recent study by Nicholls and Polman (2008) used a think aloud protocol to explore stress and coping during six holes of golf, via Level 2 Verbalizations. Before the data collection commenced, the participants received instructions and took part in some think aloud exercises. To ensure that Level 2 verbalizations were obtained, the participants were instructed not explain their thoughts, but say what they were thinking. Participants were asked to talk continuously throughout the six holes of golf other than when they were just about to draw their club back for a shot, and resume talking straight after the shot completion. The participants were told that if they were quiet for more than 20 seconds, they would be asked to continue thinking aloud by the researcher who walked behind the golfers. As such, with the exception of the researcher, each participant performed alone.

Following the completion of the warm up exercise the participant was wired up to a digital voice recorder, with a microphone attached to their collar. All digital files were transcribed verbatim and then subjected to protocol analysis (Ericsson and Simon, 1993). Transcripts were checked for relevance and consistence. Verbalizations are considered relevant if they relate to the task and consistent if they flow with previous verbal data. Verbal data that is not deemed relevant to the task or inconsistent with previous verbalizations is removed. Ericsson and Simon's protocol analysis was then adapted to specifically assess stress and coping using an inductive analysis procedure (e.g., see Maykut and Morehouse, 1994). Similar meaning units (e.g., coping strategies) were grouped together and a rule of inclusion, that summarized the essence of each meaning unit, was written for each coping strategy. This was then discussed with other members of the research team. Once this was carried out stressors and coping strategies were tallied. The final procedure was member-checking (Lincoln and Guba, 1985), in which participants received a chronologically ordered profile of coping strategies and are asked to comment upon the accuracy of their report. Overall, the results of Nicholls and Polman (2008) revealed that stressors and coping

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then adapted to specifically assess
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were grouped together and a rule of
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of the research team. Once this was
d. The final procedure was member-
nts received a chronologically ordered
nt upon the accuracy of their report.
revealed that stressors and coping



strategies varied across the six holes of golf. Additionally, golfers reported up to five stressors before deploying a coping strategy.

Think aloud protocols are useful if a researcher intends to explore coping over time. Data can be tallied across different time periods (e.g., holes within golf or laps within motor racing), so that frequencies can be established over time. Although think aloud protocols reduce the time between the stressful event and the recall of the corresponding coping strategies to a few seconds, a potential issue relates to whether the verbalizations reported as stressors actually caused the participants stress, which then has implications with regards to whether the subsequent strategies can be classified as coping. (see Krathwohl, 1993, for an explanation of credibility). Construct validity could be assessed by comparing the verbal reports with other measurements, such physiological measurements of stress (e.g., heart rate or blood pressure). Further, data from think aloud protocols could be compared with those obtained from sport-specific stress and coping inventories administered after the event. Finally, think aloud will only be suitable for a limited number of sports, due to the requirements of the protocol. In sports such as soccer or basketball it would be virtually impossible for athletes to verbalize their thoughts whilst sprinting.

### Ecological Momentary Assessment

Another method that has been used to assess coping, although not among athletic populations, is ecological momentary assessment (EMA; Larson, Csikszentmihalyi, and Graef, 1980). With this method participants are given electronic "bleepers" that go off at either random or predetermined times and the participants have to answer a series of questions (Aldwin, 2007). A potential limitation of this method within a sporting context relates to the timing of the beeps. If the bleeper goes off at inconvenient times during competition it may be impossible for the athlete to complete the questions they are supposed to answer. This method may therefore be more suitable to explore organizational stressors, whereby athletes could complete EMA assessments outside of competition. Furthermore, the questions have to be very brief, which may limit the usefulness of findings generated. Similar to diaries and think aloud protocols, a potential strength of this approach is the reduced period between the stressful event and the recall of the coping strategies used to manage such stressors. However, participants have less time for reflection, with regards to how they coped (Folkman and Moskowitz, 2004).

## Concluding Remarks

A variety of diverse techniques have been used to assess coping among athletes. Before deciding which method to use, it is essential that one considers the research question that needs to be addressed. If the research question is directed towards examining individual experiences of coping, then interviews or open-ended diaries and think aloud protocols will be more suitable. In contrast, questionnaires or concept maps might be more suitable if the aim of the research is to make generalisations among large groups of athletes. All of the methods have strengths and limitations, as mentioned in this chapter.

A common observation for all three scales reviewed in this chapter is that there have been a surprisingly very small number of studies testing their psychometric properties. Many coping researchers have utilised these scales without examining how valid the scales are with their own data. This is rather worrying as the coping responses included in these questionnaires might vary in relevance as a function of factors such as the timing of the assessment (e.g., before or after a competition), the type of sport, the nature of the stressor or individual differences. For example, coping responses such as analysing past performances or using relaxation techniques might not be possible in fast-paced sports or during competition. The low or no-usage of certain strategies might result in very low mean scores and potentially floor effects when associating the scores from these scales with various antecedents and outcome variables. It seems that it might be counter-productive to attempt to identify for each scale a definite number of items and factors that would generalise across moderators such as type of sport, culture, stressors, or timing of assessments. Thus, it is strongly suggested that future studies on coping should subject to CFA the coping instruments they use so that researchers can develop a better understanding of which coping strategies or functions are more relevant to different stressors or samples.

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